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AUTHOR Rincover, Arnold
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ABSTRACT

To assess whether over selectivity is a generalized problem in a given autistic child, eight over selective children were identified and then tested to determine whether they would respond over selectively across a wide variety of tasks. Data suggested that autistic children sometimes respond to multiple features and sometimes they respond over selectively. Preliminary studies also suggested that the relative location of cues strongly influences stimulus control. It was suggested that a training program for autistic children should include a set of target behaviors designed to promote responding to stimuli separated in space. Drawings of stimulus materials and graphs showing response data are included. (SBH)

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The Nature and Importance of Stimulus Control Deficits in Autistic Children

Arnold Rincover

University of North Carolina at Greensboro

Presented in symposium on "Current research with autistic children" at Association for Behavior Analysis, June, 1979, Dearborn, Michigan.

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Perceptual deficits of one kind or another figure prominently in virtually all comprehensive descriptions of autistic children. The investigation of such deficits seems particularly timely in view of the limited and slow progress of autistic children in behavior therapy. If there are some "key" perceptual or attentional deficits, then perhaps we can develop an attention training program which will allow these children to learn from their natural environment, and thereby produce more efficient, widespread behavior change.

A number of studies have explored stimulus control deficits in autistic children. These studies clearly show that autistic children respond to a very restricted portion of their environment. For example, in a now classic study, Lovaas, Schreibman, Koegel, and Rehm (1971) trained groups of autistic, retarded, and normal children to respond (by pressing a bar) to a complex stimulus containing visual, auditory and tactile components. After training, the components were presented separately to assess which had acquired control over responding. The authors found that the normal children responded to all three components, and the autistic children to only one component, while retarded children responded between these extremes. These data suggest that autistic children's behavior comes under the control of <u>fewer</u> cues than does the behavior of normal children, a phenomenon the authors labelled "stimulus overselectivity". Systematic replications have since shown this finding to be common among autistic children and overselectivity has been evident whether the components were visual, auditory, or crossmodal, whether social stimuli or nonsense stimuli were used, and whether 2 or 3 components were included in the stimulus complex.

Importantly, this is not just a laboratory phenomenon: Overselectivity has been found to interfere with the acquisition of language, social and

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emotional behavior, the generalization of treatment gains, and the effectiveness of common teaching strategies. For example, Lovaas et al. (1971) reported that during verbal imitation training a child selectively responded to the therapist's lip movements, and could no longer imitate the model when the therapist's lips were covered. At UCLA, a child learned to identify his father solely on the basis of his glasses. When the glasses were removed, the child acted as if he were a stranger. Drs. Koegel and Schreibman have cautioned us to be wary of our use of prompts or guiding stimuli, such as underlining or pointing, since autistic children typically hook on the prompts and learn nothing about the intended training stimulus. Bob Koegel and I found that for almost half of the autistic children tested, treatment gains failed to transfer to new settings because children responded overselectively to an incidental, unintended cue during the original training, a cue (such as an arm movement) which of course was not available in other settings.

It is clear, then, that autistic children are overselective and that this overselectivity may in theory account for many of the behavioral deficits of autistic children. In short, it may be a very worthy target behavior for treatment. However, before we can plan a comprehensive attention training program, several important questions remain to be answered. First, the importance of overselectivity as a target behavior will depend in part on whether it is a general problem. There are as yet no studies assessing whether a given child is in fact overselective across a wide variety of learning situations. Second, we don't know yet what overselectivity is, and therefore what to treat -- One proposal is that autistic children respond to <u>fewer</u> features than normals, however, other explanations are possible.

At Greensboro, we have begun to study both of these questions. To

assess whether overselectivity is in fact a generalized problem in a given child, we identified overselective children, using the same procedures as Koegel and Wilhelm, and then tested whether they would respond overselectively across a wide variety of tasks. An M.A. matched normal group also participated as a control. The first task is shown in Figure 1. On this task, each child was taught separately to respond to each of 3 versions of a circle. Each circle was made up of a series of dots. The only difference between the 3 versions was the distance between adjacent dots in the circle; Consequently, we have the small, medium, and large distance conditions. In a counterbalanced order, each of the 3 versions were taught to each of 8 overselective autistic children. After discriminative responding was established in response to the instruction "Touch the circle", we thinned the schedule of reinforcement and presented the test stimuli on nonreinforced trials. The test stimuli will assess whether children responded overselectively to the dots, or whether children responded to the Gestalt (circle). The results, shown in the second Figure, show that overselective children were not always overselective. The number of responses to multiple features (the "gestalt") in a block of 20 test trials is shown on the vertical axis, and the three distance conditions are shown across the top. In the small distance condition, 7 of the eight children responded to the circle, whereas in the large dot condition only one child responded to the circle. The medium distance condition shows responding between these extremes, as 4 children responded to the gestalt and four children overselected on the features. The normal children responded to the circle in all 3 conditions, even though they were matched on M.A.

These data suggest that autistic children sometimes respond to multiple features, as in the small distance condition, and sometimes they respond overselectively, as in both the large distance condition and the pretest.

Responding to a reduced number of features, then, may not be the generalized problem, or "key" deficit, we first suspected.

It is interesting, though, that these data suggest that another variable may be at work -- the distance between stimuli may influence whether or not they both acquire control over responding. Perhaps autistic children have some kind of "tunnel vision", responding only to stimuli in close proximity to each other.

We designed a series of studies to test this possibility, and the preliminary data do suggest that the relative location of cues strongly influences stimulus control. Figure 3 illustrates one of our training stimuli. During pretraining, we established a discrimination between a circle and a diamond. Subsequently, we surrounded the pretrained stimuli with 2 rows of numbers -- in this case, "1"s and "3"s around the S^D (circle), and "2"s and "6"s around the S^Δ(triangle). Two conditions were planned -- in the "small distance condition" the 1s and 3s (2s and 6s) are closer to the pretrained feature than is the case in the "large distance" condition. Each child was trained in both conditions, approximately one week apart. The stimulus control test assesses which of the three S^D features acquired control over responding, in this case the circle, the 1s, and/or the 3s. To test, for example, whether or not children responded to the circle, all of the numbers were made irrelevant and redundant, as shown in the first pair of test stimuli.

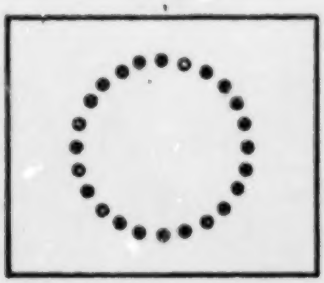
The results are shown in Figure 4. The plain bar represents responding from the large distance condition, while the striped bar represents responding in the small distance condition. The results for the pretrained feature (e.g. circle) are shown in the upper graph. The data reveal that the children responded to the pretrained circle -- here labelled "S^D feature 1" -- in both the large and small distance conditions. However,

the results for S^D feature 2, the numbers closest to the circle, tell quite a different story. We find that all of the children responded to it when it was close to the pretrained feature, but none of the children responded to it when it was a few centimeters further from the pretrained feature. The third, or outer, stimulus did not acquire control over responding in either condition; However in a subsequent phase, we moved the outer stimulus even closer, and then the children responded to all three components of the S^D.

These preliminary data open up the possibility that, functionally speaking, autistic children may have some kind of tunnel vision, where the relative location or distance between features is an important variable influencing stimulus control. Still, it remains difficult to plan a comprehensive attention training program -- we don't know how general this problem of tunnel vision might be; we don't know if it's an explanation of "stimulus overselectivity", or an additional deficit -- but these data may suggest that a training program for autistic children should include a set of target behaviors designed to promote responding to stimuli separated in space.

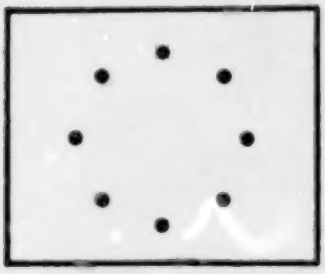
STIMULUS MATERIALS

TRAINING STIMULI



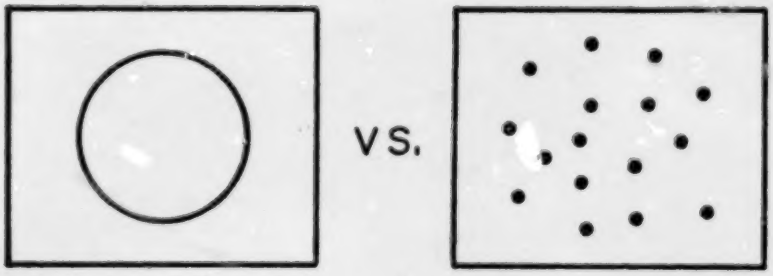
Small Distance Condition

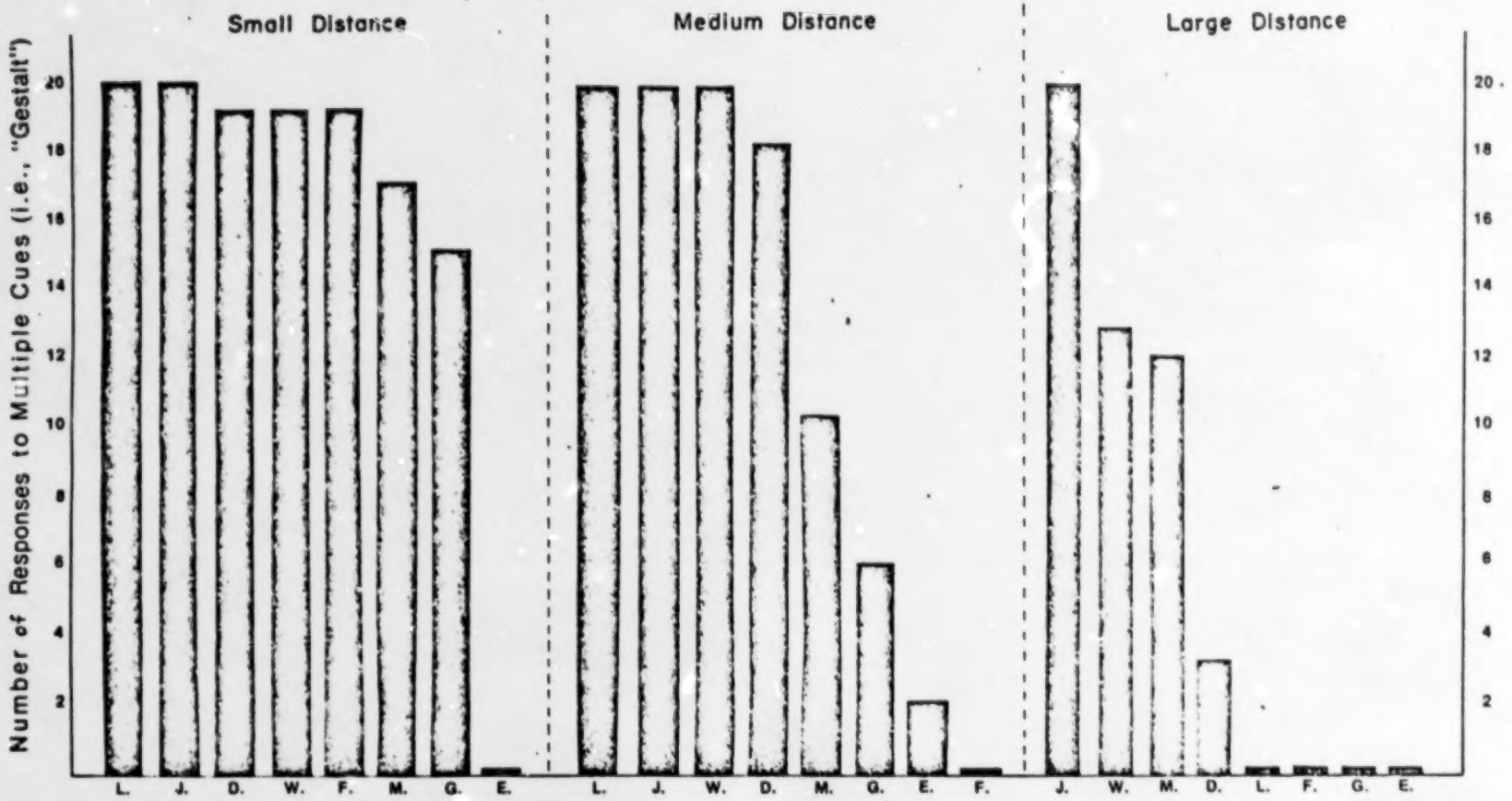
Medium Distance Condition



Large Distance Condition

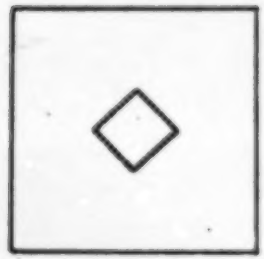
TEST STIMULI



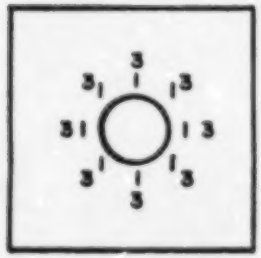


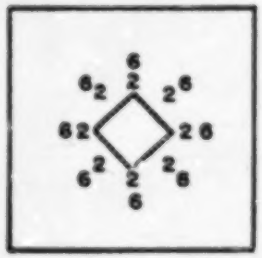
L-Lorcan W-Wendall
D-Donald G-Gary
F-Frankie M-Missy
J-Johnny E-Eric

PRETRAINING

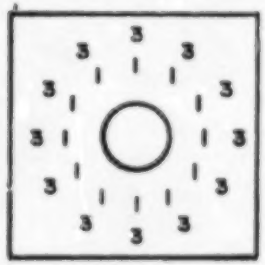


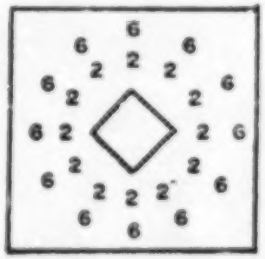
SMALL DISTANCE





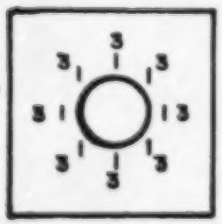
LARGE DISTANCE

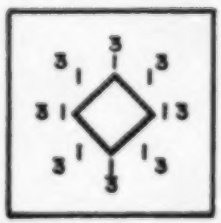




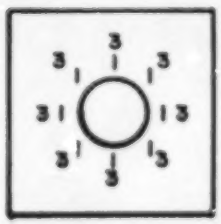
STIMULUS CONTROL TEST

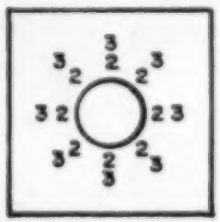
STIMULUS 1



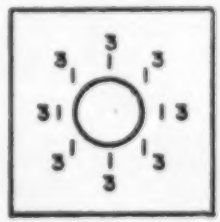


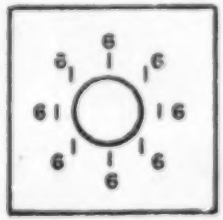
STIMULUS 2

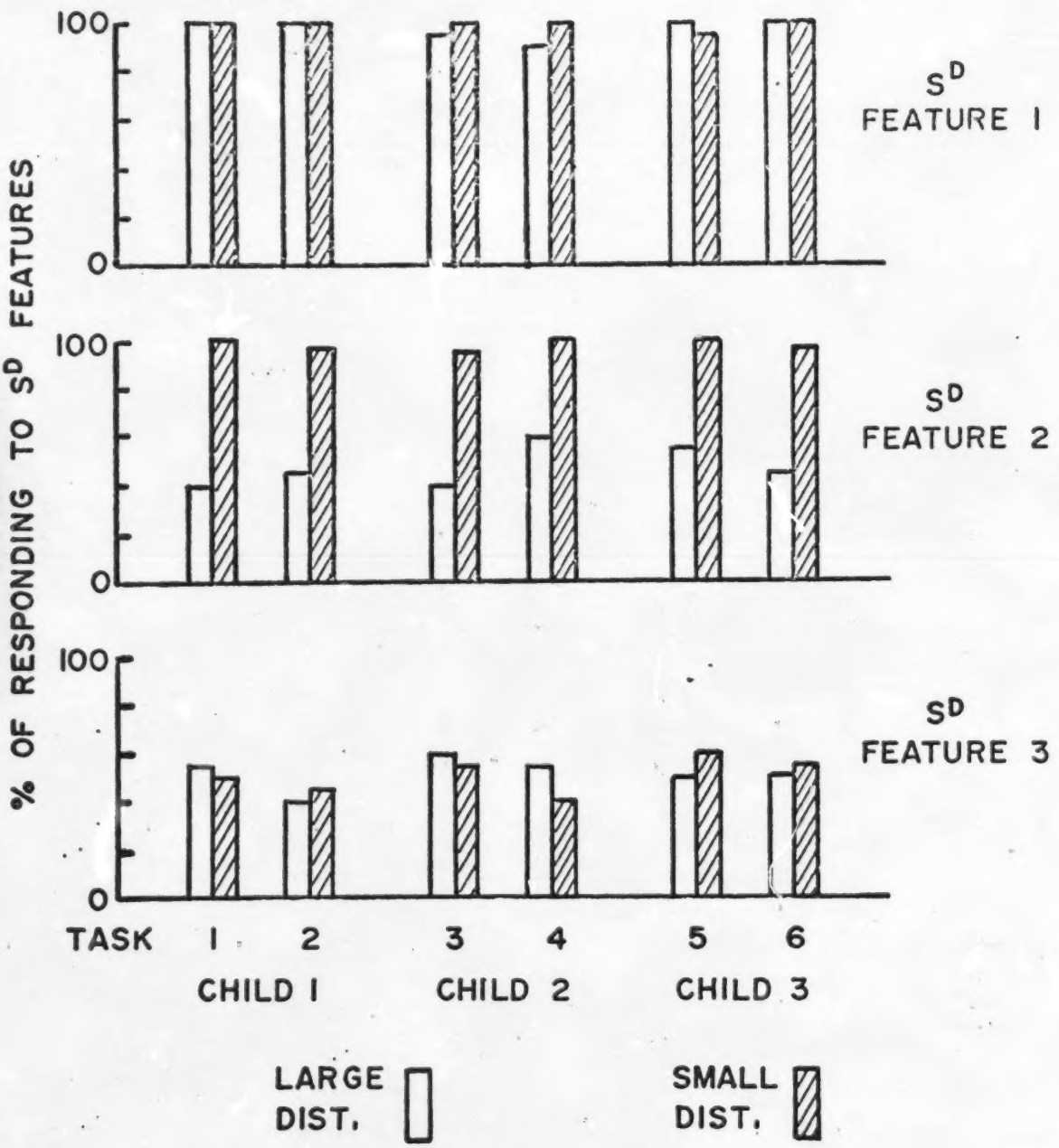




STIMULUS 3






100
0
S^D FEATURE 1
100
0
S^D FEATURE 2
100
0
S^D FEATURE 3
% OF RESPONDING TO S^D FEATURES
TASK 1 2 3 4 5 6
CHILD 1
CHILD 2
CHILD 3
LARGE DIST.
SMALL DIST.